African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

Unlocking the Potential of Open Data Morocco: Implementation, Use, Observations and Perspectives.

Auteur 1 : EL HAMZAOUI Omar
Auteur 2 : KHARBOUCH Omar

EL HAMZAOUI Omar, (ORCID ID: https://orcid.org/0009-0002-9501-0975, PhD Student)
Ibn Tofail University – Kenitra/ Faculty of Economics and Management

KHARBOUCH Omar, (ORCID, Professor-Researcher)
Ibn Tofail University – Kenitra/ Faculty of Economics and Management

Déclaration de divulgation : **L'auteur n'a pas connaissance de quelconque financement qui pourrait affecter l'objectivité de cette étude.**

Conflit d'intérêts : **L'auteur ne signale aucun conflit d'intérêts.**

Pour citer cet article : **EL HAMZAOUI .O & KHARBOUCH .O (2023) « Unlocking the Potential of Open Data Morocco: Implementation, Use, Observations and Perspectives », African Scientific Journal « Volume 03, Numéro 20 » pp: 917 – 944.**

Date de soumission : Septembre 2023

Date de publication : Octobre 2023

DOI : 10.5281/zenodo.10143831

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

Abstract

The Open Data Morocco project serves as a strong catalyst for entrepreneurial and digital innovation, through the promotion of the open public data from administrations, public institutions and enterprises. This movement is part of Morocco's ongoing economic and social transformation. Open data is based on a free and open access exposure at the level of a National Portal, of the data produced by the relevant organizations and institutions using open, standard and well-documented formats to facilitate their exploitation and reuse. The purpose of this research work is to analyze and highlight the introduction of Open Data in Morocco, as a vector of digital transformation, with a range of impact on various dimensions: societal, legal, digital, organizational. Based on the hypotheses drawn from the literature review, and after 18 months from the launch of the Open Data portal: www.data.gov.ma, we intend to analyze the key parameters linked to the implementation and use of Open Data, and its prospects for development. To achieve this, we adopted an exploratory and descriptive method based, firstly, on a quantified analysis of the Open Data KPIs set to measure the parameters linked to the supply, implementation and use of the Open Data portal. Secondly, on semi-directive interviews with the operational managers of the portal in order to identify by theme their perspectives of development. As the main conclusion of this study, the feeding function of the Open Data Morocco portal linked to its implementation, had a direct positive impact on its utilization by users.

Keywords

Open data, portal, implementation, use, KPIs

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

Introduction

Open data as a concept was born in 2009 in the United States and the United Kingdom following a new approach to the management and publication of public data in favor of a resurgence of the commons approach in the digital ecosystem, some apprehend these open data shared as potential unprecedented forms of common goods as stated by (Larroche, Peyrelong et Beaune, 2018).

This movement, is more specifically part of the specific movement of Open Data from the public sector, supported by governmental and territorial authorities supporting policies aimed at creating dedicated platforms. More precisely, In Morocco, the study of the issue of Open Data, as a project of application of the right of access of citizens to public information was raised on March 31, 2012 by the general assembly of the Economic, Social and Environmental Council (ESEC) which had entrusted, within the framework of the self-referral procedure, the Commission for Cultural Affairs and New Technologies to study this project, as it showed on their report (ESEC, 2013).

The scope of this project is twofold: it aims to give concrete form to the advances made by the Constitution of July 2011 in terms of the right of access to public information while enabling Morocco to comply with a number of its international commitments, and to meet the standards in force in all democratic countries.

With the advent of the digital era, a new movement, called Open Government Data (or Open Data), emerged under a new dimension of the right of access to information, emphasizing the possibility of exploiting and reusing public information through free access to raw data collected or produced by administrations for their valorization.

Beyond the progress it implies in terms of democracy and transparency, Open Data aims through the innovative approach to provide citizens and businesses with access to public data; to boost economic development by making information more widely available and circulating it more efficiently; to develop information technologies and establish a digital economy. Open Data, like many of the vectors of digital transformation, is based on a whole range of movements: societal, legal, digital, cultural, organizational and citizen-based. This requires the implementation of appropriate mechanisms, particularly legal and operational, to drive the paradigm shift in the role of public administration.

As demonstrated by Carmes, M. & Pélissier, M. (2021), Open Data is a crucial tool for improving the quality of public services. In fact, the main beneficiary of the provision/feeding/supply of raw data by the administration is the administration itself. In a

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

communication at Open government Data Camp (2010) "Studies conducted in certain developed countries have shown that 70% of public data that has been subject to transactions was acquired and used by other public entities".

Morocco through its Maroc Numeric 2013 e-gov strategy had set up a first version of data.gov.ma in March 2011, which made Morocco a pioneer country in terms of Open Data platform. the Open big Data Maroc project was relaunched by the Digital Development Agency (DDA) and financed by the world bank through the new version of the national open data portal www.data.gov. ma, by the end of 2021, with over 250 datasets covering 14 themes and 24 public administrations and establishments, thus constituting an important lever for reinforcing this transformation and promoting the opening up of public data, mainly from public administrations, establishments and companies, and local authorities, and maximizing the impact of their reuse and exploitation by the various socio-economic players.

The subject of this paper addresses the efforts made by Moroccan public administrations, establishments and companies to ensure the proper implementation of datasets that meet the various evolving needs of socio-economic players, and thus make the most of Open Data applications by maximizing the use of the national Open Data portal http://www.data.gov.ma. As a result, we will be looking more closely at the link between the implementation of the portal and its use, and at the prospects for developing an ecosystem conducive to the use and promotion of public data. The aim of this research, is to study the potential linked to the use and promotion of the open data portal in Morocco as a function of its supply and implementation by public data, and to draw out its development prospects as an important lever for the promotion of the opening of public data.

To address this issue, the research study will be structured in two main parts. This paper will first present the key concepts of Open Data, the data life cycle, detailing the steps involved in publishing open data, as well as the legal framework of Open Data. Secondly, we will explore, through our empirical study, the relationship between the implementation of the Open Data portal and its use, presenting the methodology used and the study's findings.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

1. Literature review and hypothesis development:

1.1. Context

In recent years, Morocco has committed itself to its economic and social transformation by developing entrepreneurship and digital innovation in the private sector, through improving transparency and modernizing public administration. In this context, the Open Big Data Morocco project was launched by the Digital Development Agency (DDA) through a new version of the national open data portal www.data.gov.ma, constituting an important lever to reinforce this transformation and promote the opening of public data that mainly come from administrations, public institutions and enterprises, and local authorities and maximize the impact of their reuse and exploitation by various socio-economic actors.

Following the example of the world's developed countries, Open Data Morocco aims beyond the right of access to information, Open Data focuses on two main dimensions: access to raw data and the ability to reuse these data from the portal that hosts data sets from certain organizations and institutions, and references data sets hosted on sectoral open data portals.

1.1.1 Concept of Open data

Open data is a concept that emerged in 2009 in the United States and the United Kingdom and inspired by a new approach to public services and the management and publication of public data, based mainly on intra- and extra-governmental collaboration that aims to promote transparency of governance, by providing citizens with the means to evaluate the policies implemented by the government and their impacts.

At the global level, 153 governments have adopted the Open data portal according to the latest e-government survey conducted by the Department of Economic and Social Affairs in 2020. As shown in Figure 1, Europe is at the forefront of continents in Open data provision in all sectors of activity, while Africa is at the bottom of the ranking compared to other regions, particularly in the sectors of environment, justice and social security.

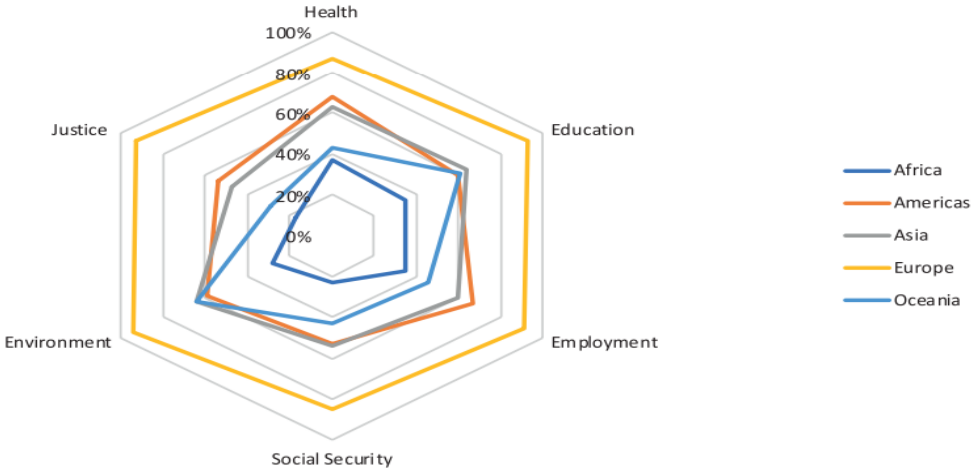
Explicitly, “Open Data consists of exposing, in free and open access, data produced by the concerned organizations and institutions at the level of the national open data portal and/or the portals of these organizations and institutions using open, standard and documented formats to facilitate the exploitation and reuse of these data” (Definition taken from the Portal: www.data.gov.ma).

The diversity of typologies related to the concept of data makes it difficult to define this concept precisely. The main challenge in defining the notion of "research data" in the field of scientific research is to identify what can bring together such diverse elements as a photograph of a beetle collected in Madagascar, a spectroheliogram produced in Meudon, information about the genes

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

of a mold, meteorological records from a ship that crossed the Atlantic in the 18th century, or the recording of a rare dialect. All these elements have in common that they are (now) digital data, produced during a research process, as demonstrated by (Gaillard, 2014).

Figure N°1: Provision of sectoral Open Data through International Open Data Initiatives



Source: e-government survey conducted by the United Nations Department of Economic and Social Affairs

This concept originates from the conviction that government data of any type according to table 1, should be freely available to be published, used and reused without limitations or control. According to the definition adopted by (the World Bank, 2019), data are considered “open” if anyone can use, reuse and redistribute them freely, free of charge, for any purpose and without restriction. Many data are published on the websites of public administrations, but most of them are only intended to be consulted in isolation, and are not reusable for other purposes. Open data must be reusable, that is, downloadable in an open and software-readable format, and users must be legally authorized to reuse it.(Hassan, 2021) summarized in his study the principles of Open Data. These data must be complete, primary, timely, accessible and machine-readable. They must also be non-discriminatory, non-proprietary and license-free. In addition, public institutions must publish all the data they have as long as they do not violate security, confidentiality or other legitimate restrictions. According to Larroche, V., Peyrelong, M. F., & Beaune, P. (2018) the Open data is considered a good shared by users shared by users, but only as a commodity made available to all by local authorities.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

Tableau N°1: Typology of Governmental Data

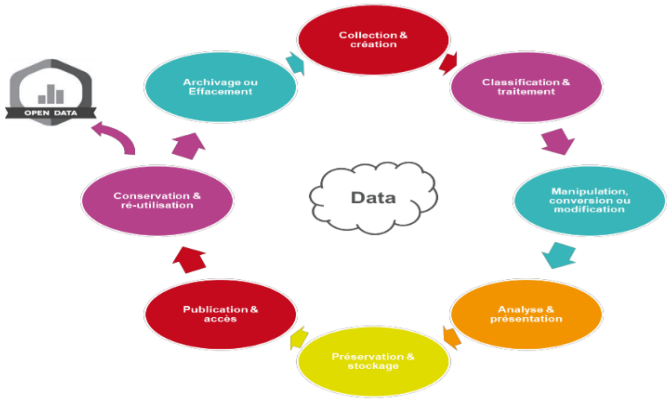
Administrative Data	Administrative divisions, addresses, public buildings, agendas, etc.
Statistical Data	Population, economy, environment.
Political Data	Election results, assembly interventions, presence, etc.
Research Data	Data generated by public research institutes and organizations.
Sectoral Data	Packed agricultural areas, annual number of tourists, passenger air traffic.
Financial Data	Exchange rates, citizen budget, finance law.

Source: developed by the authors, based on examples taken from a benchmarking

1.1.2 Data lifecycle

The main aim of implementing Open Data is to transform public structures so that their open data is at the heart of public action. The goal is to put in place several elements within public structures. Among these elements is the implementation of a robust data management process in which the publication of open data becomes an integrated output in the production and exploitation of data from its collection to its archiving. In the data lifecycle, as illustrated in Figure 2, Open Data is an integral part of this cycle in the preservation & reuse phase.

Figure N°2: ***Data lifecycle***



Source: *World Bank Group & ADD Open data manual Guide (2021)*

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

1.1.3 Legal Framework of Data

By its basic definition, data is considered "open" only if it meets two major criteria:

1. Technically open: available in a format standardized and exploitable by a machine, accessible online, and not provided in a modifiable electronic format or through a programming interface (API);
2. Legally open: possessing a licensing agreement that permits both commercial and non-commercial use and unrestricted reuse. This implies that anyone can utilize, reuse, and redistribute these data freely.

The non-profit organization "Creative Commons" has established several internationally recognized usage licenses, totaling seven, known as the Creative Commons Licenses as shown in table 2. These licenses formalize the release of data at the time of distribution, defining various levels of freedom for reuse, which are in effect today.

Tableau N°2: List of Creative Commons Licenses

Creative Commons Licenses	**Description**	**Logo**
Public Domain	CC 0	
Attribution	CC BY	
Attribution-No Derivs	CC BY-ND	
Attribution-Noncommercial	CC BY-NC	
Attribution-Non Commercial-No Derivs	CC BY-NC-ND	
Attribution-Non Commercial-Share A like	CC BY-NC-SA	
Attribution-Share A like	CC BY-SA	

Source: as listed by Creative Commons organization

In Morocco, there is a clear legal framework that governs the publication of data, distinguishing between data that can be freely published, data that cannot be disclosed, and data that require

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

processing before publication. The development of Open Data relies on two essential legislative pillars: the laws of access to information and the laws relating to the protection of personal data. The Access to Information Law, Law No. 31-13 of February 22, 2018: This law precisely defines the public information that can be disclosed upon request or proactively, Morocco (2018).The Law on the Protection of Individuals with regard to the Processing of Personal Data, Law No. 09-08 of February 18, 2009: This law provides a regulatory framework for safeguarding privacy and identifies specific data falling under its scope, along with the required processing before publication, Morocco (2009).

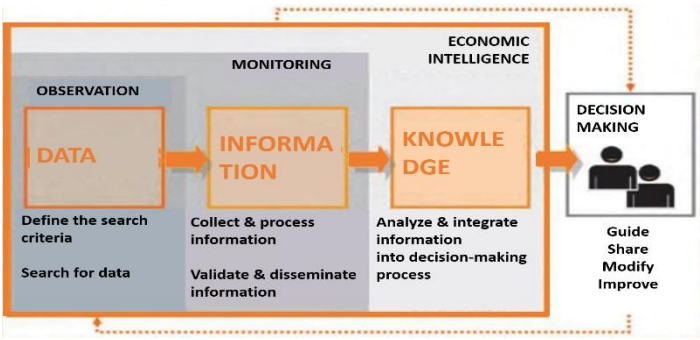
Article 27 of the 2011 Constitution states: “Citizens have the right to access information held by the public administration, elected institutions and bodies entrusted with a public service mission. The right to information can only be limited by law, in order to ensure the protection of everything related to national defense, internal and external security of the State, as well as the privacy of individuals, to prevent any infringement on the rights and freedoms stated in this Constitution, and to protect sources and areas expressly determined by law." Morocco (2011).

1.1.4 The power of data

According to (Monino & Sedkaoui , 2020), the use of data generates billions of dollars according to various reports. The McKinsey Institute recently indicated that the public release of Open Data would enable the United States to save $230 billion by 2020. This would be achieved by allowing startups to develop innovative services aimed at reducing unnecessary energy expenses.

The Hierarchical model mentioned in figure 3, can be applied to open data by using structured analysis to gather, process, and interpret data from various sources. This model can aid in understanding trends, patterns, and potential future developments within the realm of open data, helping organizations make informed decisions and optimize their data utilization strategies.

Figure N°3 : Data lifecycle



Source : Monino (2013) L’information au cœur de l’intelligence économique stratégique

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

1.1.5 Open Government, e-Government, and e-Participation: Pillars of an Open Governance System

1.1.5.1 Open Government

According to the Organization for Economic Co-operation and Development (OECD), an open government strategy is built upon the principles of transparency, integrity, accountability, and stakeholder participation. These principles are integrated from the design and implementation of public policies, providing recommendations on how to fundamentally integrate them into public sector reforms.

This concept embodies the foundations of a governance culture based on innovative and sustainable public policies, inspired by the principles of transparency, accountability, and participation, which strengthen democracy and contribute to inclusive growth.

In Morocco, the adoption of an open government approach is a key component in the success of establishing a new system of public governance. It is grounded in the Moroccan constitution, encompassing articles 1, 12, 13, 14, 15, 25, 26, 27, 28, 29, 36, 154, 155, and 156, as well as royal orientations articulated in various speeches, such as those on July 29, 2018, during the Throne Day celebration, and on October 14, 2016, at the beginning of the legislative year. Based on the OECD (2020)'s recommendations in its review report on public governance in Morocco also emphasize the need to "continue efforts to promote openness, transparency, and accessibility of digital services to enhance trust in the government and create a more transparent and accountable public sector."

To materialize these directions, a National Open Government Action Plan (OGAP) for 2021-2023 has been formulated, with the establishment of a multi-party entity to oversee the OGAP process, comprising three bodies: the Steering Committee, the Implementation Committee, and the Civil Society Space. In continuity, a portal, www.gouvernement-ouvert.ma, has been launched to consolidate all news related to the open government initiative in Morocco. This platform facilitates the transparent publication of the state of implementation of the national open government action plan by public administrations, provides a means to monitor its implementation, and offers digital spaces for citizens to engage and participate in co-creating open government action plans by submitting ideas, proposals, and contributions.

1.1.5.2 e- Government

The term e-Government (e-Gov) or online public administration emerged in the late 1990s, although the history of government digitization dates back to the early days of computing. According to the World Bank (2015), e-Government is officially defined as "the use by public agencies of information technologies (such as wide-area networks, the Internet, and mobile

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different purposes: better delivery of government services to citizens, improved interactions with businesses and industry, empowering citizens through access to information, or more efficient government management. The resulting benefits can include reduced corruption, increased transparency, greater convenience, increased revenue, and/or cost reductions."

The rapid development of e-Government in the 1990s and 2000s generated a wave of optimism regarding citizen participation through information and communication technologies (ICTs), but so far, these techno-deterministic dreams have proven unfounded, (Tayazime & Moutahaddib, 2021).

The terms e-Gov and Digital Gov are often confused by the majority of researchers, necessitating clarification. The OECD (2014) recognized a new stage of maturity in the use of digital technologies by governments, transitioning from electronic administration to digital administration, aiming to open, innovate, and modernize the public sectors. It distinguishes between the terms by providing two clear definitions: (1) e-Government refers to the use of ICTs, including the Internet, by governments as a tool for better administration; (2) digital government, on the other hand, refers to the use of digital technologies as an integral part of government modernization strategies to create public value, as demonstrated by (Tayazime & Moutahaddib 2021).

1.1.5.3 e-Participation

E-participation is generally considered a part of e-government. According to the United Nations' survey on electronic administration, e-participation is defined as the mechanism of engaging citizens through ICT in the design of policies, decisions, and services to make them inclusive and deliberative.

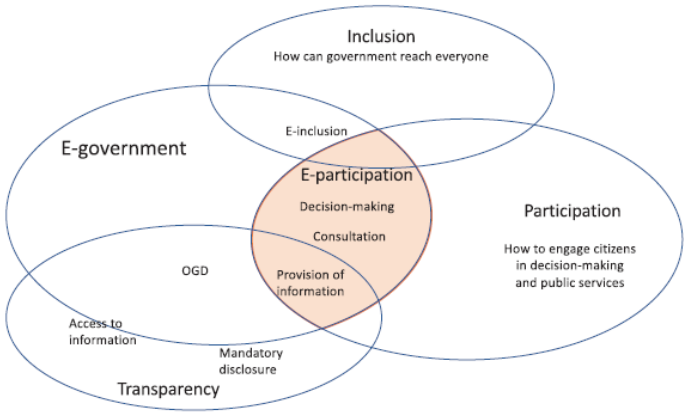
In the 2020 survey, questions about electronic participation were carefully examined and developed to reflect current trends and methods in which governments involve their populations in the development, implementation, and evaluation of public policies. Updates included information on citizens' rights to access government information and citizens' feedback regarding the improvement of online public services.

As part of the same survey, the United Nations introduced the E-Participation Index (EPI). Mathematically, this index is calculated by subtracting the lowest score from the total score of a given country and then dividing the result by the subtraction between the highest score and the lowest score, UNDESA (2020).

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

In Morocco, the Open Data portal (www.data.gov.ma) includes a dedicated section for e-participation. Users can submit or access requests for datasets. Additionally, they can interact with available requests by commenting on or supporting them, which increases their visibility. parking zone coordinates, and lists of textbooks approved by the Ministry of National Education (MNE).

Figure N°4: The relationship between e-participation and other dimensions of governance



Note: The figure represents e-participation as the intersection of participation and e-government. It highlights the three aspects of e-participation prioritized in the United Nations E-Government Survey: the provision of information, consultation, and decision-making. Transparency intersects with e-participation around the provision of information, including through open government data (OGD). Inclusion intersects with e-participation as well, especially in relation to consultation and decision-making.

Source: stated by UNDESA (2020)

1.2. Development of hypotheses

Through the literature review and in order to carry out our empirical investigation and answer our research question, we formulated the following hypotheses:

H1: The implementation and supply of Open Data foster its use by citizens and users;

H2: Users have a preference for raw data, data sets in the form of “dumps” rather than e-participation interfaces that allow querying the database to extract subsets of data;

H3: The evolving needs of future users of Open Data Morocco are met as the portal is used.

2. Research methodology

In the study of our research question, we adopted a hypothetico-inductive approach based on observational results through both quantitative and qualitative methods.

The choice of this methodological approach is motivated by the epistemological positioning linked to the inductive approach, which involves formulating conjectures based on observations that should be tested subsequently (Koenig, Gérard 1993). This mode of reasoning is based on considering observations derived from the reality of open data implementation as true. Therefore, any proposition resulting from a logical analysis related to its use and feeding can be considered as true.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

This research methodology was implemented in a two-step research process:

The first step involved conducting semi-structured interviews with operational and functional experts from the DDA responsible for the data.gov.ma portal. These interviews focused on key study areas, including implementation, use, and future development prospects of Open Data. The insights gathered from these interviews allowed us to identify the main Key Performance Indicators (KPIs) of the data portal, categorized into data provisioning and usage. We then statistically analyzed the results obtained from an exploratory documentary analysis of Open Data KPI reports covering the period from the portal's launch in December 2021 to June 2023.

The second step involved the qualitative analysis of the content from the semi-structured interviews with DDA officials. The aim was to analyze the data collected during the interviews using content analysis methodology to uncover the determinants influencing the perspectives of various stakeholders and citizens regarding the use of the Open Data portal.

Considering that the progressive deployment of the functionalities, domains of the portal and its provision have allowed to increase its use and to broaden the domains and sectors of activity related to public data, and access to public data in a flexible and efficient way while improving the quality of services provided to users.

1.1. Study field and description

To carry out our study, we decided to collect data following both a quantitative and qualitative approach to be able to identify the research variables that are closely related. Therefore, our adopted research methodology is a mixed, exploratory descriptive methodology based on the technique of documentary analysis and semi-structured interviews through:

1. Quantitative analysis through the examination of the evolution of the indicators “Open Data KPIs” extracted on the basis of a framework designed by ourselves and communicated and filled in by the operational managers of the DDA (table 3). The two main research variables are: the implementation and use of the Open Data portal: www.data.gov.ma;
2. Qualitative analysis of the results of findings and determinants related to the perspectives of evolution of Open Data Morocco, through semi-structured interviews with the functional and operational managers of the Portal classified by interview themes (table 4).

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

Tableau N°3: Open data Portal KPIs canvas

Research Construct	Variable /item	Description	Current value
OD Implementation & Provision	Item 1	Number of datasets uploaded on the OD portal	412
	Item 2	Number of added themes	19
	Item 3	Number of added resources	464
	Item 4	Number of data producers added	36
	Item 5	Number of data publication requests processed and fulfilled via the e-participation interface	14
	Item 6	Portal availability rate of www.data.gov.ma	99.98%
OD Use	Item 1	Number of visitors on the www.data.gov.ma portal	128.000
	Item 2	Number of downloads from the www.data.gov.ma portal	52.477
	Item 4	Number of pages viewed	690.000
	Item 5	Number of countries from which visitors originate	87

Source: DDA statistics on Open Data Morocco portal (06/2023)

1.2. Research Model and Data Processing

Our initial problem and objective are to explain and understand the reality and to draw out findings related to the implementation of Open Data in Morocco, as well as to test hypotheses derived from existing theories and the literature review. For our adopted research methodology, we have chosen a descriptive mixed exploratory approach based on documentary analysis and semi-structured interviews.

This approach appeared most suitable for addressing our research questions. Additionally, (Wacheux, 1993) highlights that "the use of a case study methodology is justified by the

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

complexity of the studied problem. It involves a spatial and temporal analysis of a complex phenomenon, considering conditions, events, actors, and implications," necessitating a comprehensive documentary research. In this context, our research work involves an exploratory analysis of quantitative data, leveraging Key Performance Indicators (KPIs) extracted from activity reports on the platform and interviews with experts from the DDA. This approach allows us to highlight the relationships between the supply/provision and usage of Open Data through tables and graphical representations. Moreover, it enables us to analyze the interconnections forming our research problem, leading to precise scientific conclusions and insights into the prospects of Open Data development in Morocco.

Table 1:Table of correlation calculations between KPIs for data supply and usage.

Correlation relationship				Correlation coefficient (r)
OD supply		OD usage		
Item 1	Number of datasets fed into the OD portal	Item 2	Number of downloads from the www.data.gov.ma portal	0,947
Item 2	Number of themes added Item	Item 1	Number of visitors to the www.data.gov.ma portal	0,999
		Item 7	Number of page views	0,953
Item 4	Number of data producers	Item 2	Number of downloads from the www.data.gov.ma portal	0,966
		Item 7	Number of page views	0,971
Item 5	Number of data publication requests processed via the e-participation interface	Item 1	Number of datasets fed into the OD portal	0,0193
Item 1	Number of datasets fed into the OD portal	Item 5	Number of data publication requests processed via the e-participation interface	0,999

Source: Authors' calculations, from the evolution data of Key KPIs on Open Data Morocco portal (2023) over the study period

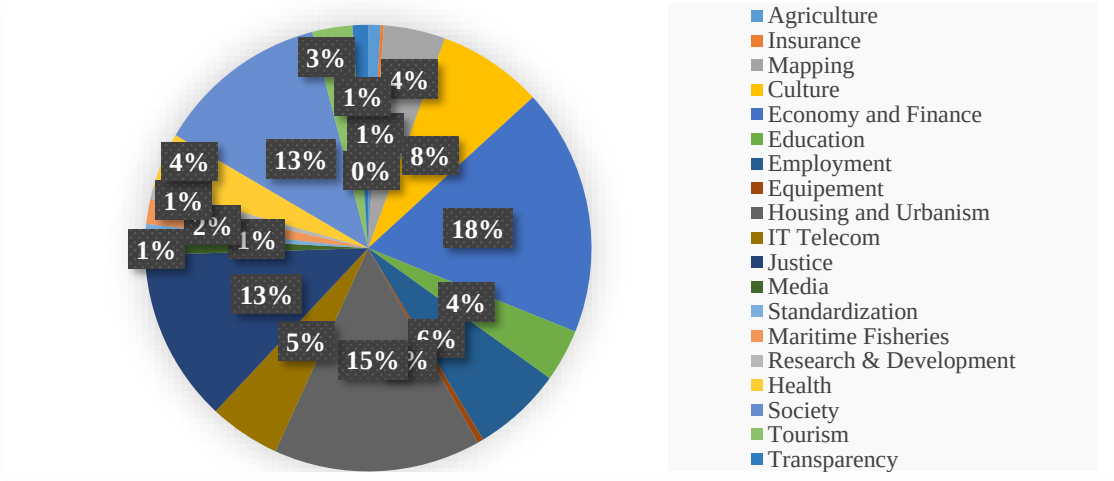
2. Results & Discussion

The results of this analysis and exploration of the designed KPIs have allowed us to understand the implementation strategy carried out by the National Open Data Steering Committee of Morocco and to explain the evolution and performance in terms of data usage, supply, and the quality of service rendered to users. From this perspective, we have observed that the DDA has undertaken numerous actions in line with the National Open Data Action Plan. Notably, the flagship indicator for data provision has shown a significant increase of over 100% in the number of published datasets (Figure 5), as well as in the number of website visits and

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

downloads recorded during the first year of the portal's deployment. This clearly illustrates the dynamic environment created around the portal.

Figure 1: Distribution of Datasets on the Open Data Portal by theme as indicated by Open data Maroc portal



Source: by the autors based on reported KPIs for Open Data provided by DDA

2.1. Descriptive Statistics

2.1.1. Evolution of Implementation and Data supply Indicators for Open Data: 2021-2023

2.1.1.1. Evolution of published datasets on the OD Portal

The number of datasets published on the portal has experienced a significant increase since its launch, starting with 136 datasets. By the 1st semester of 2023, this indicator reached 412 published datasets (figure 6). This substantial increase can be attributed to the existing potential of open data that can be published by various public institutions and organizations that voluntarily embraced the concept of open data through the National Open Data Portal. Furthermore, this progression can also be attributed to the efforts made by the DDA in terms of communication, training, and awareness campaigns. These endeavors aimed at encouraging both existing and new data producers to publish their public datasets.

It is worth noting that the implementation of the new "e-participation" feature in 2023, aimed at processing user requests on the platform, has facilitated feeding of new datasets to the portal.

2.1.1.2. Evolution of the number of themes published on the OD portal: 2021-2023

The number of data themes published on the portal has experienced a parallel increase to that of datasets during the same period. It is worth noting that the portal was initially launched with 9 data themes and has now expanded to include 19 themes, representing an increase of over

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

100% in less than two years (figure 7). This significant growth can be attributed to two main factors:

– The first factor is related to the increase and addition of new data producers operating across various socio-economic sectors in Morocco.
– The second factor is linked to the introduction of the "e-participation" section, which is designed to address user requests and cater to the evolving needs of users for specific themes.

2.1.1.3. Evolution of the number of data producers on the OD portal

Data producers refer to organizations and state institutions that contribute to the Open Data portal by providing open datasets. A dedicated section for consultation has been set up on the portal to allow quick access to datasets grouped by their respective producers.

This indicator originally encompasses the two previous indicators: datasets and data themes, as it is intuitively strongly related to their evolution. This indicator has shown significant growth, increasing from an initial number of 16 data producers to 36 producers during the first half of 2023. This represents a remarkable increase of over 100%, similar to the pace of evolution observed for data themes and datasets (figure 8).

2.1.1.4. Number of data publication requests processed via the e-participation interface

This indicator reflects the level of interactivity with users on the portal. The examination of the report extracted from the portal www.data.gov.ma revealed a total of 14 requests for the addition of public data (figure 9), distributed across the following themes:

- Health theme: 2 requests
- Directory theme: 5 requests
- Economy and finance theme: 3 requests
- Agriculture theme: 1 request
- Research and development theme: 2 requests
- Justice theme: 1 request

As indicated in the analysis of the evolution of the number of data producers, the e-participation interface has played a key role in enriching the pool of data producers on the portal.

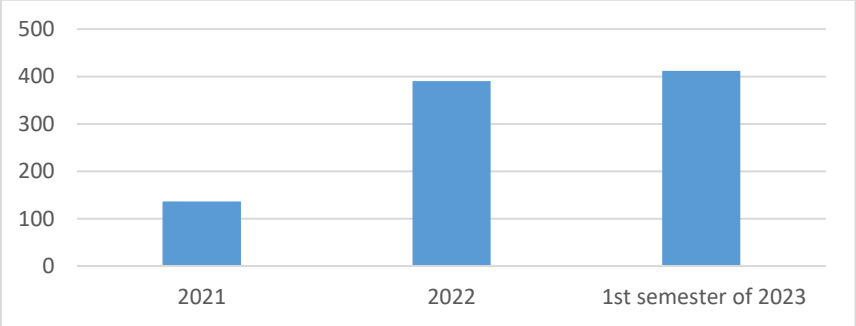
Upon analyzing the graph representing the evolution of the number of data publication requests processed via the e-participation interface, it can be observed that the requests have remained relatively stable over the three reporting periods, with a potential slight increase predicted towards the end of the year 2023. In comparison to other supply KPIs that have experienced

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

significant growth, this particular indicator does not show a remarkable evolution. This observation can be explained by two hypotheses:

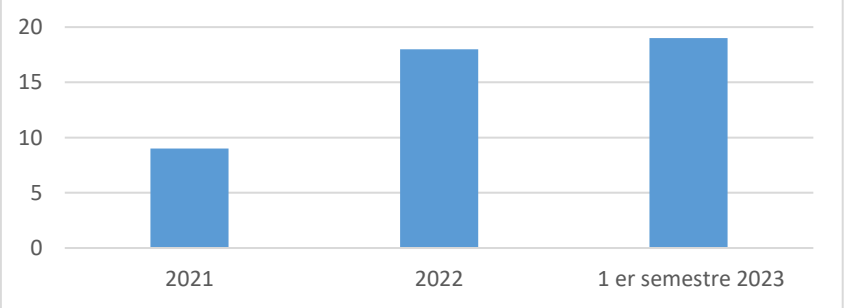
- The first hypothesis confirms that users have a preference for raw data published directly rather than processed data that caters to specific needs.
- The second hypothesis suggests that the increased provision of diverse datasets on the portal allows for anticipating potential user needs.

Figure 2: Evolution of the number of datasets fed on the OD Portal



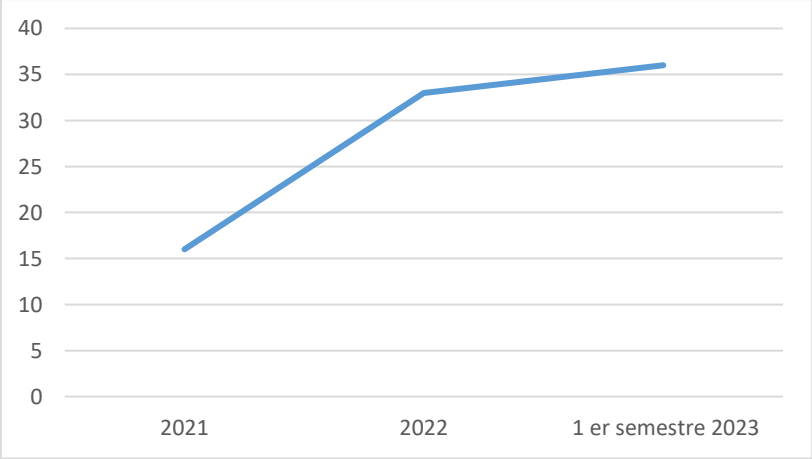
Source: compiled by the authors, based on reported KPIs for Open Data provided by DDA

Figure 3: Evolution of the number of added themes on the OD Portal



Source: compiled by the authors, based on reported KPIs for Open Data provided by DDA

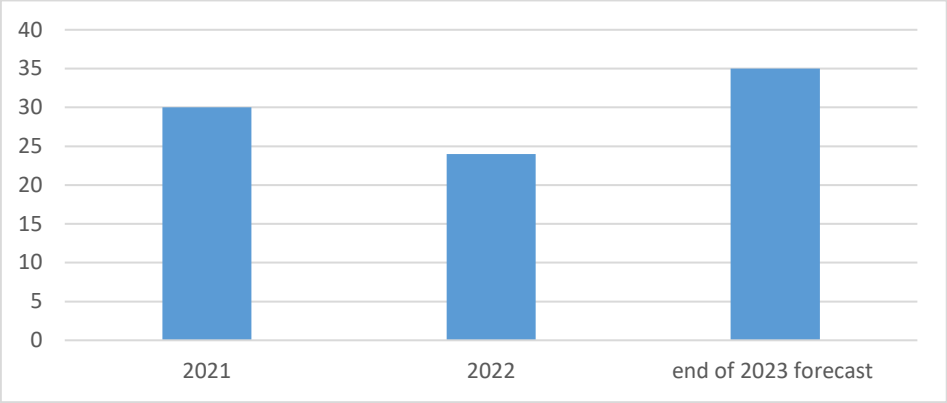
Figure 4: Evolution of the number of data producers on the OD Portal



Source: compiled by the authors, based on reported KPIs for Open Data provided by DDA

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

Figure 5: Number of data publication requests processed via the e-participation interface



Source: compiled by the authors, based on reported KPIs for Open Data provided by DDA

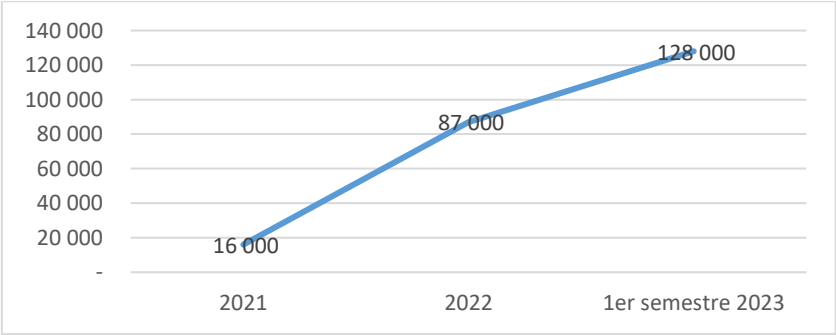
2.1.2. Evolution of Open Data Portal Usage Indicators: 2021-2023

2.1.2.1. Evolution of the number of visitors to the Data Portal

Based on the observations drawn from the graph in Figure 4, the usage of the Morocco Open Data portal has seen a significant increase during the study period, parallel to the progressive implementation of the portal with diverse datasets and themes catering to the varied needs of users from different categories.

The number of visitors to the Morocco Open Data portal surpassed 100.000, reaching 128.000 visitors in the first half of 2023, indicating a growth of over 47% compared to **the year 2022.** However, this indicator alone is insufficient to fully analyze the use of the portal's data, as some visits may not involve actual use of the published data (Figure 10).

Figure 6: Evolution of the number of visitors to the Data Portal



Source: compiled by the authors, based on reported KPIs for Open Data provided by DDA

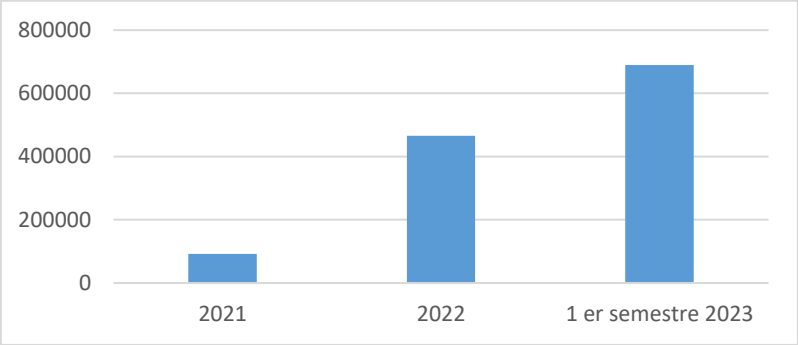
2.1.2.2. Evolution of the number of page views on the OD

The number of page views on the Morocco Open Data portal is closely related to the number of visitors and confirms the increased user traffic on the portal during the study period. The number of page views rose from 92.000 in 2021 to 466.000 in 2022, and further increased to

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

690.000 in the first half of 2023, representing a 48% increase compared to 2022, for the first half of 2023 alone (Figure 11).

Figure 7: Evolution of number of page views on the OD

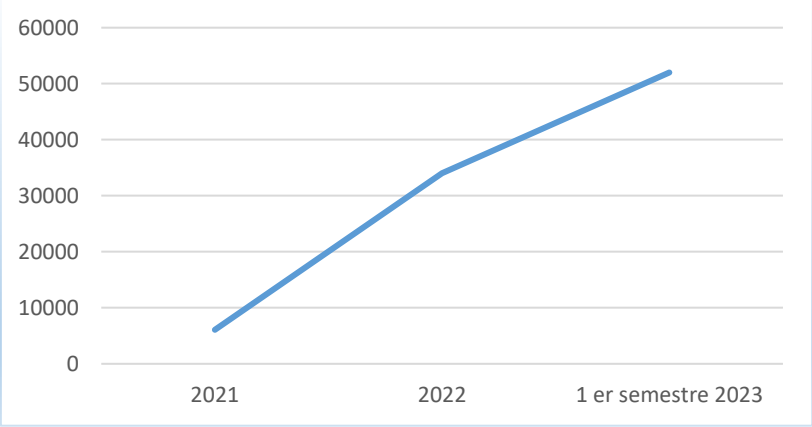


Source: compiled by the authors, based on reported KPIs for Open Data provided by DDA

2.1.2.3. Evolution of the number of downloads on the OD portal

The number of downloads from the Morocco Open Data portal exhibits a clear upward trend, as seen in Figure 12, reflecting an increasing frequency of access to the published data by users. This indicator correlates with the number of uploads to the portal's hosting server. In addition to the analysis of the previous indicator regarding visitor traffic around the portal, the evolution of this key indicator highlights the growing demand for utilizing the data published under various themes, experiencing a 53% increase between 2022 and the first half of 2023.

Figure 8: Evolution of the number of downloads on the OD portal



Source: compiled by the authors, based on reported KPIs for Open Data provided by DDA

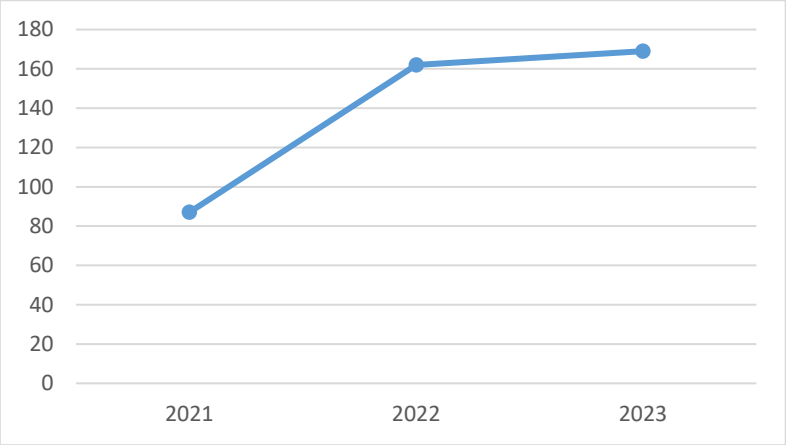
2.1.2.4. Evolution of number of countries of visitor origin

This indicator provides further insights into the global reach of the Morocco Open Data portal and offers a glimpse of its level of attractiveness beyond national borders. The analysis of its evolution, as shown in Figure 13, reveals a progressive trend of visitors from other countries

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

around the world. The number of countries of origin increased from 87 in 2021 to 169 (mainly from Europe and Asia) in the first half of 2023, representing a significant surge of over 94%. This substantial increase can be attributed to the existing potential of portal users and data seekers from other countries, showing a keen interest in accessing open public data available on the portal.

Figure 9: Evolution of number of countries of visitor origin



Source: compiled by the authors, based on reported KPIs for Open Data provided by DDA

2.1.3. Correlation Coefficients

The correlation coefficient is the specific measure adopted to quantify the strength of the linear relationship between the key indicators of the two variables: supply (X) vs. utilization (Y). The coefficient is denoted as 'r' in the correlation matrix calculated using the formula:

$$rxy = \frac{COV(X,Y)}{\sqrt{V(X) \times V(Y)}}.$$

The choice of the Pearson correlation coefficient is primarily based on the accuracy criterion associated with the KPI values, which are of a technical nature, obtained from the reporting extracted from the hosting platform of the OD portal, having undergone no degree of estimation or aberration. In light of this observation, the selection of the Pearson correlation coefficient (r) remains a logical choice for determining the intensity of the linear correlation between two indicators arising from the studied variables: provision and use of OD.

According to Table 5, the results obtained from the correlation calculation table analyzed between the items of the two study variables have revealed a strong positive correlation (r) approaching 1, indicating the intensity of a linear association between the sub-variables of supply and the utilization of OD. This is evident in the correlations among the following:

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

- The number of added themes and the number of visitors to the OD portal;
- The number of data producers and the number of downloads on the OD portal;
- The number of data producers and the number of page views on the OD portal;
- The number of supplied datasets and the number of downloads on the OD portal;
- The number of supplied datasets and the number of visitor countries of origin.

Table 2: Examination of results for formulated hypotheses

Hypotheses	Correlation	Correlation Coefficient (r)	Correlation Significance
H1	Item1/ OD supply - Item 2/ OD usage	0,947	Accepted
	Item 4/ OD supply - Item 2/ OD usage	0,966	
	Item 2/ OD supply - Item 1 / OD usage	0,999	
H2	Item 6 / OD supply - Item 1/ OD usage	0,0193	Rejected
H3	Item 4/alimentation OD - Item 2/usage OD	0,966	Accepted
	Item 1/alimentation OD - Item 6/ usage OD	0,999	
	Item1/alimentation OD - Item 2/usage OD	0,947	

Source: compiled by the authors, based on reported KPIs for Open Data provided by DDA

2.2. Results of Qualitative Studies

The data was collected through four semi-structured interviews with experts from the OD portal at the DDA (Table 6). Specifically, the Head of Digital Transformation Department of the company, the Head of Digital Transformation Department of the Economy, and others. The aim is to analyze the collected interview data using the content analysis method to determine potential areas of development for the Open Data Morocco project and the perspectives that influence development in both aspects of the study: implementation and perspectives.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

Table 3: Interview results by theme compiled by the authors

Open data aspect	Interview Theme	Content of results
Governance & Steering Aspects	1. Open Data Steering Committee; 2. Data Governance; 3. Communication and awareness around the use of the Open Data portal	- Expansion of the national Open Data Steering Committee to involve any other organization, institution, or expert in the field that can enrich the portal with content or successful experience; - Development of common data repositories and their periodic update: geographical repositories, addresses, activity nomenclature, etc.; - Implementation of communication and awareness actions tailored to different Open Data targets (public, private actors, civil society, etc.).
Functional aspects	1. Development of new features on the portal: www.Data.gov.ma; 2. Enhancement of budget transparency	- Creation of a dedicated interface for reuse, allowing users to query the exploitation of downloaded data from the portal and analyze their reuse; - Development and adoption in consultation with the Moroccan open government portal, of a permanent consultation mechanism to involve citizens in the preparation of the citizen's budget.
Organizational aspects	1. Allocation of necessary resources for the proper functioning of the portal; 2. Formalization of operational data management proceedings	- Creation of a Data Manager position within each organization; - Development of necessary procedure manuals: Open Data Manager, Data Manager, data inventory.
Aspects Techniques	1. Technical assistance to public institutions and bodies; 2. Deployment of new formats for published data; 3. Technical standardization	- Implementation of technical support for relevant public institutions and bodies; -Identification of technical standards (format, metadata, etc.) to be established for the publication of open data, in accordance with international standards.
Legal & Regulatory Aspects	1. Expansion of the legal framework; 2. Right of Access to Information at the level of ministries and public institutions	- Strengthening and development of the legal framework related to the opening and classification of public data; - Implementation of the network of persons responsible for access to information, as a space for sharing experiences

Source: compiled by the authors

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

2.3. Discussion and Hypotheses Testing

Hypothesis 1 (H1): "The implementation and feeding of Open Data further promote its utilization by citizens and users." According to Table 5, the correlation coefficient (r) demonstrates positive and satisfactory values of 0.947, 0.966, and 0.999, which are close to the value of 1. This confirms a positive relationship between the studied constructs, namely the implementation and feeding of Open Data, and the utilization of the Open Data portal. This is reflected in quite significant correlations between the supply items and the utilization items:

1. The number of fed datasets and the number of downloads on the OD portal;
2. The number of data producers and the number of downloads on the OD portal;
3. The number of added themes and the number of portal visitors.

These three validated correlations confirm a positive relationship between the constructs. Thus, Hypothesis (H1) is validated. This result aligns with the findings of the United Nations Department of Economic and Social Affairs' 2020 e-government survey, which affirms the evolving trends in the use of public data across countries worldwide, with the number of countries with Open Data portals increasing from 43 in 2018 to 153 (an 80% increase). Making open data available enhances public access to information. This observation is corroborated by the results of the 2020 survey on access to individual data, indicating that while there has been improvement since 2018, regional percentages of access to individual data vary.

Hypothesis 2 (H2): "Users have a preference for raw data, dataset 'dumps,' over e-participation interfaces allowing queries for subsets of data." The analysis of the correlation between the number of requests for publication of processed data through the e-participation interface and the number of fed datasets on the OD portal reveals a coefficient (r) with a value of 0.0193. This demonstrates a positive yet insignificant correlation between these two variables, indicating a weak relationship between the number of e-participation queries and the evolving number of themes fed and published on the OD portal. The historical evolution of requests for specific data through the e-participation section does not mirror the pace of feeding and utilizing the OD portal. This is explained by users' preference for raw data available on the portal over processed data via the interactive e-participation feature. Therefore, Hypothesis (H2) is validated. This observation aligns with the findings of the United Nations' 2020 e-government survey regarding e-participation, which demonstrates its progress faces various existing and new challenges and risks, such as cybersecurity and data privacy.

Hypothesis 3 (H3): "The evolving needs of future users of Open Data Maroc are gradually fed through portal utilization." According to Table 5, the correlation coefficient (r) indicates positive and satisfactory values of 0.966, 0.999, and 0.947, which are close to the value of 1.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

These correlations reflect a positive relationship between three items of the "OD supply" variable and three items of the "OD usage" variable:

1. The number of fed datasets and the number of downloads on the OD portal;
2. The number of data producers and the number of downloads on the OD portal;
3. The number of fed datasets and the number of visitor countries on the OD portal.

Given the highly significant and positive correlation values between variables related to OD portal utilization and variables related to user needs being fed into the portal, Hypothesis (H3) is therefore validated.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

Conclusion

Through this study, we aimed to analyze the implementation, feeding, and usage of Open Data Morocco, focusing on its underlying factors and outcomes. We observed that the feeding function of the Open Data Morocco portal (linked to its implementation) had a direct positive impact on its utilization by users.

Considered a lever for establishing a new system of public governance, free and open access to data produced by public institutions and organizations via a National Portal remains a tool recently discovered by Moroccan users from various categories: citizens, civil society, businesses, professionals, researchers, etc. Over a period spanning three fiscal years: 2021, 2022, and 2023 (up to the first semester), the implementation and feeding of the Open Data portal had a very positive impact on the demand and utilization of public open data. The evolution of these two parameters demonstrates a growing trend in user needs that are potentially evolving, quantitatively expressed in previous KPI analyses, and qualitatively expressed through the expansion of published data themes on the portal and through prospective axes for the development of the Open Data portal and its national and international perspectives. However, the challenges to be addressed are of various dimensions. Institutionally, they include the avoidance culture of certain government institutions hesitant to open public data, the cumbersome procedure for accessing and reusing data, and the lack of consideration of user ideas in governmental administration. On the user level, challenges encompass the lack of advanced research facilities, user support facilities, and user expertise to analyze data.

Open Data also faces a number of obstacles that may hinder its development and implementation. Some of these obstacles are related to data producers or data users. In Morocco, these challenges can be attributed to both parties and are primarily related to:

- The predominance of a closed government culture and the lack of an open public data policy;
- Insufficient and inaccurate data availability, including obsolete and invalid data;
- Difficulty in searching and navigating data due to lack of metadata or an index, complex data formats, available datasets' complexity, information overload, and a lack of open data usage manuals;
- Absence of a national policy standardizing open data management;
- Lack of metadata standards and absence of standardized software for open data processing.

Other obstacles are faced by both data publishers and open data users, including:

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

- Technical unawareness of metadata quality among portal owners, leading to inappropriate metadata publication that hinders users from finding relevant data for their needs;
- Geospatial data has its specific barriers due to the use of different standards compared to other types of open data, requiring technical knowledge and expertise.

Based on our analysis of the results, we can conclude that this study provides evidence of the impact of feeding Open Data with quality public data that meets the evolving needs of users on the utilization and promotion of Open Data in Morocco. By working towards establishing a new approach to utilizing public data that favors Morocco's move towards open government, focusing on openness, transparency, and accessibility of digital services, this study aims to strengthen trust in the government.

This research offers several recommendations. Future researchers could empirically examine the effect of the public data reuse function on citizen engagement and involvement in sectoral policies in Morocco. Studies could also compare two or more regions within the same culture to assess the significance of public data openness in entrepreneurship and local development. Finally, considering the importance of Open Data as a digital transformation tool, this study regards the quality of the information system of public data producers as an accelerator for implementing an open public data polic.

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

BIBLIOGRAPHIE

Carmes, M., & Pélissier, M. (2021). L'Open Data du secteur public au prisme de la pensée des communs : une techno-politique empêchée ?. Territoires contemporains, 11. Retrieved from [⟨hal-03577194⟩].

Constitution of Morocco (2011), articles 1, 12, 13, 14, 15, 25, 26, 27, 28, 29, 36, 154, 155, and 156, 4-39.

Creative Commons. (n.d.). About licenses - Creative Commons. Retrieved from [https://creativecommons.org/licenses/].

Digital development agency (2020). General Guidelines Note for the Development of Digital in Morocco by 2025 p.8 [Avril_NOG_ADD_fr_SITE_VF.pdf]

Economic, Social and Environmental Council (ESEC) (2013). « Open Data La libération des données publiques au service de la croissance et de la connaissance », 32-116. Retrieved from [Avis-du-CESE-Open-data.pdf

Gaillard, R. (2014). De l'Open data à l'Open research data : quelle(s) politique(s) pour les données de recherche ? [Thesis for the diploma of State Librarian]. Ecole Nationale Supérieure des Sciences de l'Information et des Bibliothèques.

Hassan Abdelrahman, O. (2022). Open Government Data: Development, Practice, and Challenges. IntechOpen. (pp2-17) doi: 10.5772/intechopen.100465.

Koenig, Gérard, (1993), " Production de la connaissance et constitution de pratiques organisationnelles ", Revue de Gestion des Ressources Humaines p 4-17;

Larroche, V., Peyrelong, M. F., & Beaune, P. (2018). L'ouverture des données publiques : un bien commun en devenir. *tic&société, 12*(1), 255-281.

Loi n° 31-13 relative au droit d'accès à l'information. Dahir n° 1-18-15 du joumada II 1439 522 Février 2018). Bulletin officiel, n° 6670, pp. 1142-1146. Retrieved from [BO_6670_Fr.pdf (oc.gov.ma)].

Loi n° 09-08 relative à la protection des personnes physiques à l'égard du traitement des données à caractère personnel. Dahir n° 1-09-15 du 22 safar 1430 (18 février 2009). Bulletin officiel,n°5710,pp.338-343. Retrieved from [sgg.gov.ma/Portals/0/publications/Protec_fr.pdf].

Monino, J. L., Soraya Sedkaoui, S. (2020), Big Data, Open Data et valorisation des données

Monino, J. L. (2013). L'information au cœur de l'intelligence économiquestratégique. *Marché et organisations,* (2), 25-39.

OECD. (2020). OECD Public Governance Reviews: Morocco - Achieving Results through Openness and Transparency. OECD. Retrieved from [Diagnostic d'intégrité au Maroc : Mettre en œuvre des politiques d'intégrité pour renforcer la confiance | Examens de l'OCDE sur la gouvernance publique | OECD iLibrary (oecd-ilibrary.org)]

OECD. (2014). Recommendation of the Council on Digital Government Strategies. Retrieved from [Recommendation-digital-government-strategies.pdf (oecd.org)].

African Scientific Journal
ISSN : 2658-9311
Vol : 3, Numéro 20, Octobre 2023

Open Data Morocco portal (2023). Statistiques | Portail de l'Open Data au Maroc : www.data.gov.ma

Tayazime, J., & Moutahaddib, A. (2021). La Transformation Digitale de l'Administration Publique au Maroc : La Perception des Usagers Particuliers. *Revue de Gestion et d'Économie*, *9*(1 & 2), 71-85.

United Nations, E-Government Survey UNDESA (2020). Digital Government in the Decade of Action for Sustainable Development (Sales No. E.20.II.H.1).Retrieved from [United Nations Department of Social and Economic Affairs > Research > UN e-Government Surveys].

Wacheux,F. (1993). L'utilisation de l'étude de cas dans l'analyse dans les situations de travail : Propositions méthodologique constructiviste, (p.128).

World Bank. (2015) website. e-Government (worldbank.org).

World Bank Group & ADD (2021). World Bank Group & ADD Open data manuel Guide Open Data (ROD). (p.4-17). Retrieved from [Open_data_manuel_ROD_Avril 2021.pdf].

World Bank. (2019). Open Data Essentials. Retrieved from [https://opendatatoolkit.worldbank.org/en/essentials.html].